

**Claims:**

1. A method of depositing a silicon germanium film on a substrate comprising:  
placing the substrate within a process chamber;  
heating the substrate to a temperature in a range from about 500°C to about 900°C;  
maintaining a pressure in a range from about 0.1 Torr to about 200 Torr;  
providing a deposition gas comprising SiH<sub>4</sub>, GeH<sub>4</sub>, HCl, a carrier gas and at least one dopant gas; and  
depositing the silicon germanium film epitaxially on the substrate.
2. The method of claim 1, wherein the at least one dopant gas is a boron containing compound selected from the group consisting of BH<sub>3</sub>, B<sub>2</sub>H<sub>6</sub>, B<sub>3</sub>H<sub>8</sub>, Me<sub>3</sub>B, Et<sub>3</sub>B and derivatives thereof.
3. The method of claim 2, wherein the silicon germanium film is deposited with a boron concentration in a range from about  $1 \times 10^{20}$  atoms/cm<sup>3</sup> to about  $2.5 \times 10^{21}$  atoms/cm<sup>3</sup>.
4. The method of claim 1, wherein the at least one dopant gas includes an arsenic containing compound or a phosphorus containing compound.
5. The method of claim 1, wherein the carrier gas is selected from the group consisting of H<sub>2</sub>, Ar, N<sub>2</sub>, He and combinations thereof.

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6. The method of claim 5, wherein the deposition gas further comprises a member selected from the group of consisting of a carbon source,  $\text{Cl}_2\text{SiH}_2$  and combinations thereof.

7. The method of claim 5, wherein the temperature is in a range from about  $600^\circ\text{C}$  to about  $750^\circ\text{C}$ .

8. The method of claim 5, wherein the silicon germanium film is grown to a thickness in a range from about  $100 \text{ \AA}$  to about  $3,000 \text{ \AA}$ .

9. The method of claim 8, wherein the silicon germanium film is deposited within a device used for CMOS, Bipolar or BiCMOS application.

10. The method of claim 9, wherein a fabrication step is selected from the group consisting of contact plug, source/drain extension, elevated source/drain and bipolar transistor.

11. The method of claim 1, wherein the silicon germanium film is deposited to a first thickness, therein  $\text{SiH}_4$  is replaced by  $\text{Cl}_2\text{SiH}_2$ , and a second silicon germanium film is deposited to a second thickness on the silicon germanium film.

12. The method of claim 1, wherein a silicon-containing film is deposited to the substrate before the silicon germanium film.

13. The method of claim 12, wherein the silicon-containing film is deposited from a process gas comprising  $\text{Cl}_2\text{SiH}_2$ .

14. A selective epitaxial method for growing a silicon germanium film on a substrate comprising:

placing the substrate within a process chamber at a pressure in a range from about 0.1 Torr to about 200 Torr;

heating the substrate to a temperature in a range from about 500°C to about 900°C;

providing a deposition gas comprising SiH<sub>4</sub>, a germanium source, an etchant source, a carrier gas and at least one dopant gas; and

growing selectively the silicon germanium film with a dopant concentration in a range from about  $1 \times 10^{20}$  atoms/cm<sup>3</sup> to about  $2.5 \times 10^{21}$  atoms/cm<sup>3</sup>.

15. The method of claim 14, wherein the germanium source is selected from the group consisting of GeH<sub>4</sub>, Ge<sub>2</sub>H<sub>6</sub>, Ge<sub>3</sub>H<sub>8</sub>, Ge<sub>4</sub>H<sub>10</sub> and derivatives thereof.

16. The method of claim 15, wherein the carrier gas is selected from the group consisting of H<sub>2</sub>, Ar, N<sub>2</sub>, He and combinations thereof.

17. The method of claim 16, wherein the temperature in a range from about 600°C to about 750°C.

18. The method of claim 17, wherein the etchant source is selected from the group consisting of HCl, SiCl<sub>4</sub>, CCl<sub>4</sub>, H<sub>2</sub>CCl<sub>2</sub>, Cl<sub>2</sub>, derivatives thereof and combinations thereof.

19. The method of claim 14, wherein the at least one dopant gas is a boron containing compound selected from the group consisting of BH<sub>3</sub>, B<sub>2</sub>H<sub>6</sub>, B<sub>3</sub>H<sub>8</sub>, Me<sub>3</sub>B, Et<sub>3</sub>B and derivatives thereof.

20. The method of claim 14, wherein the at least one dopant gas is selected from the group consisting of an arsenic containing compound and a phosphorus containing compound.
21. The method of claim 14, wherein the deposition gas further comprises a member selected from the group consisting of a carbon source,  $\text{Cl}_2\text{SiH}_2$  and combinations thereof.
22. The method of claim 17, wherein the silicon germanium film is grown to a thickness in a range from about 100 Å to about 3,000 Å.
23. The method of claim 22, wherein the silicon germanium film is deposited within a device used for CMOS, Bipolar or BiCMOS application.
24. The method of claim 23, wherein a fabrication step is selected from the group consisting of contact plug, source/drain extension, elevated source/drain and bipolar transistor.
25. The method of claim 14, wherein the silicon germanium film is deposited to a first thickness, therein  $\text{SiH}_4$  is replaced by  $\text{Cl}_2\text{SiH}_2$ , and a second silicon germanium film is deposited to a second thickness on the silicon germanium film.
26. The method of claim 14, wherein a silicon-containing film is deposited to the substrate before the silicon germanium film.

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27. The method of claim 26, wherein the silicon-containing film is deposited from a process gas comprising  $\text{Cl}_2\text{SiH}_2$ .

28. A selective epitaxial method for growing a silicon-containing film on a substrate comprising:

placing the substrate within a process chamber at a pressure in a range from about 0.1 Torr to about 200 Torr;

heating the substrate to a temperature in a range from about  $500^\circ\text{C}$  to about  $900^\circ\text{C}$ ;

providing a deposition gas comprising  $\text{SiH}_4$ ,  $\text{HCl}$  and a carrier gas; and

growing the silicon-containing film at a rate between about  $50 \text{ \AA}/\text{min}$  and about  $600 \text{ \AA}/\text{min}$ .

29. The method of claim 28, wherein the deposition gas further comprises at least one dopant gas.

30. The method of claim 29, wherein the at least one dopant gas is a boron containing compound selected from the group consisting of  $\text{BH}_3$ ,  $\text{B}_2\text{H}_6$ ,  $\text{B}_3\text{H}_8$ ,  $\text{Me}_3\text{B}$ ,  $\text{Et}_3\text{B}$  and derivatives thereof.

31. The method of claim 30, wherein the silicon-containing film is deposited with a boron concentration in a range from about  $1 \times 10^{20} \text{ atoms}/\text{cm}^3$  to about  $2.5 \times 10^{21} \text{ atoms}/\text{cm}^3$ .

32. The method of claim 28, wherein the at least one dopant gas includes an arsenic containing compound or a phosphorus containing compound.

33. The method of claim 28, wherein the carrier gas is selected from the group consisting of H<sub>2</sub>, Ar, N<sub>2</sub>, He and combinations thereof.

34. The method of claim 33, wherein the temperature is in a range from about 650°C to about 800°C.

35. The method of claim 28, wherein the deposition gas further comprises a member selected from the group of consisting of a carbon source, Cl<sub>2</sub>SiH<sub>2</sub> and combinations thereof.

36. The method of claim 28, wherein the silicon-containing film is deposited within a device used for CMOS, Bipolar or BiCMOS application.

37. The method of claim 36, wherein a fabrication step is selected from the group consisting of contact plug, source/drain extension, elevated source/drain and bipolar transistor.

38. The method of claim 28, wherein the silicon-containing film is deposited to a first thickness, therein SiH<sub>4</sub> is replaced by Cl<sub>2</sub>SiH<sub>2</sub>, and a second silicon-containing film is deposited to a second thickness on the silicon-containing film.

39. The method of claim 28, wherein a second silicon-containing film is deposited to the substrate before the silicon-containing film.

40. The method of claim 39, wherein the second silicon-containing film is deposited from a process gas comprising Cl<sub>2</sub>SiH<sub>2</sub>.

41. A selective epitaxial method for growing a silicon-containing film on a substrate comprising:

placing the substrate within a process chamber at a pressure in a range from about 0.1 Torr to about 200 Torr;

heating the substrate to a temperature in a range from about 500°C to about 900°C;

providing a deposition gas comprising  $\text{Cl}_2\text{SiH}_2$ , HCl and a carrier gas;

depositing a silicon-containing layer on the substrate;

providing a second deposition gas comprising  $\text{SiH}_4$ , HCl and a second carrier gas; and

depositing a second silicon-containing layer on the silicon-containing layer.

42. A method of depositing a silicon-containing film on a substrate comprising:

placing the substrate within a process chamber;

heating the substrate to a temperature in a range from about 500°C to about 900°C;

maintaining a pressure in a range from about 0.1 Torr to about 200 Torr;

providing a deposition gas comprising a silicon-containing gas, a germanium source, HCl, at least one dopant gas and a carrier gas selected from the group consisting of  $\text{N}_2$ , Ar, He and combinations thereof; and

depositing selectively the silicon-containing film epitaxially on the substrate.